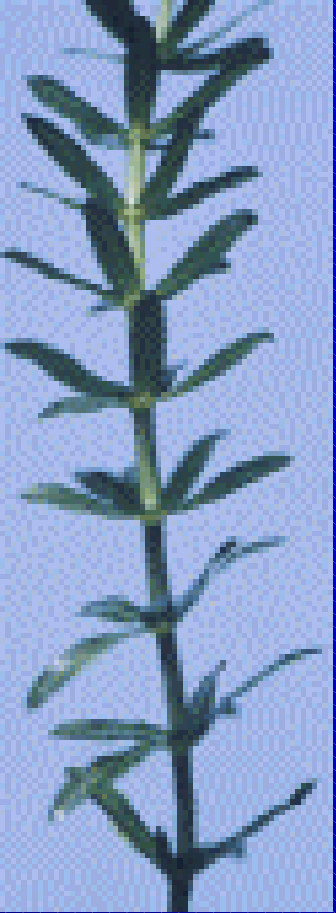


# Lake County Project

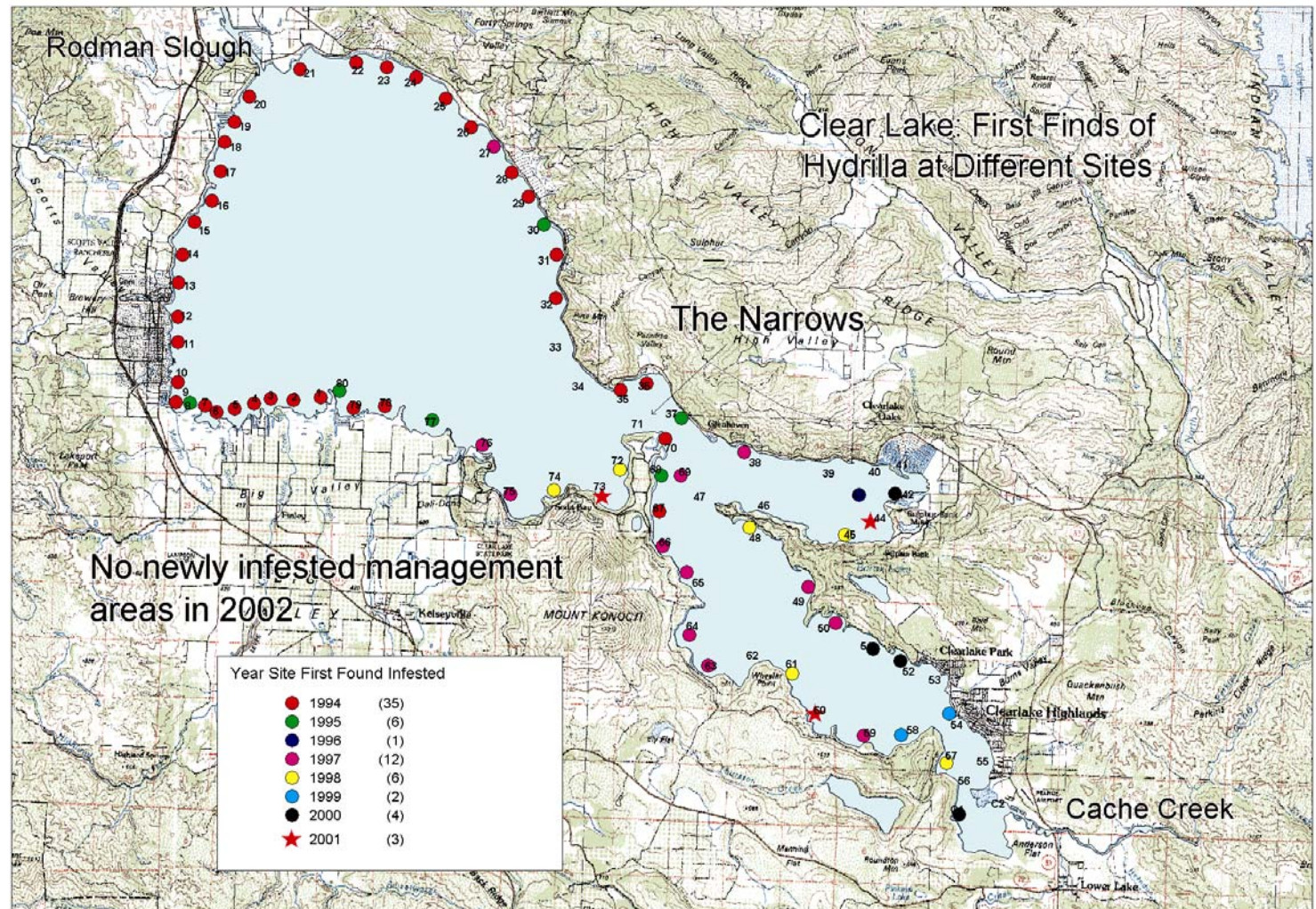
- CDFA:
  - Frank Zarate, APC-Supervisor
  - Robert Hesterberg, APC-Specialist
  - Robin Breckenridge, District Biologist
  - Kelly Brannigan, Ag Biologist
- Lake Co.:
  - Steve Hajik, Ag Commissioner



# Lake County Project

- Short History
  - Monoecious hydrilla discovered in 1994
  - Survey in 1994/5 found 200 infested acres along shore of upper arm
  - Scientific Advisory Panel (1994)
  - 82 management units



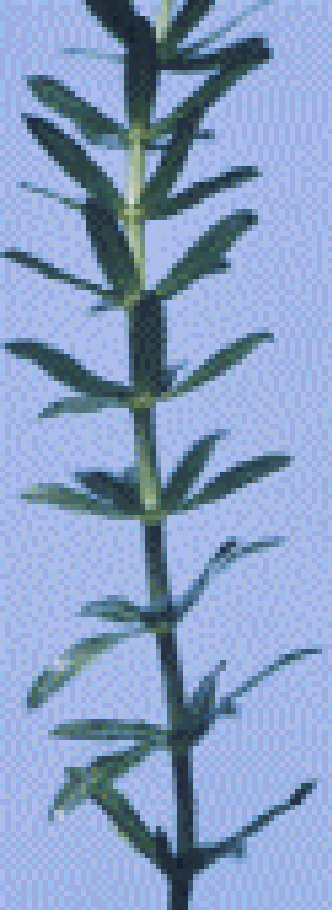


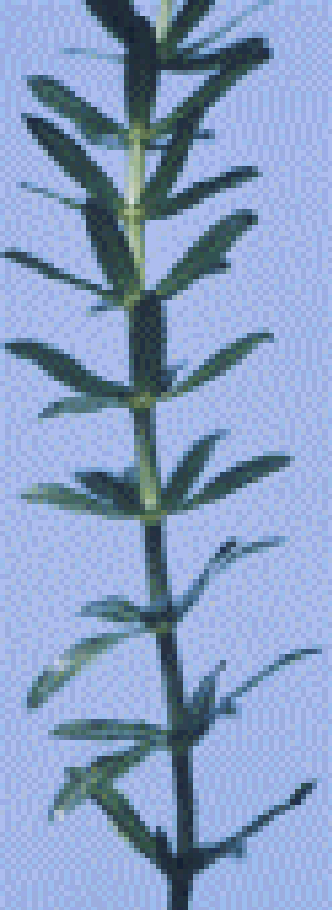
# Lake County Project

- Surveys in Clear Lake
  - Visual, Grappling hook
  - 2001, 1042 surveys
  - 2002, 790 surveys
- Initial finds
  - 2001, May 29
  - 2002, June 19
- Last finds
  - 2001, Nov 07
  - 2002, Oct 15

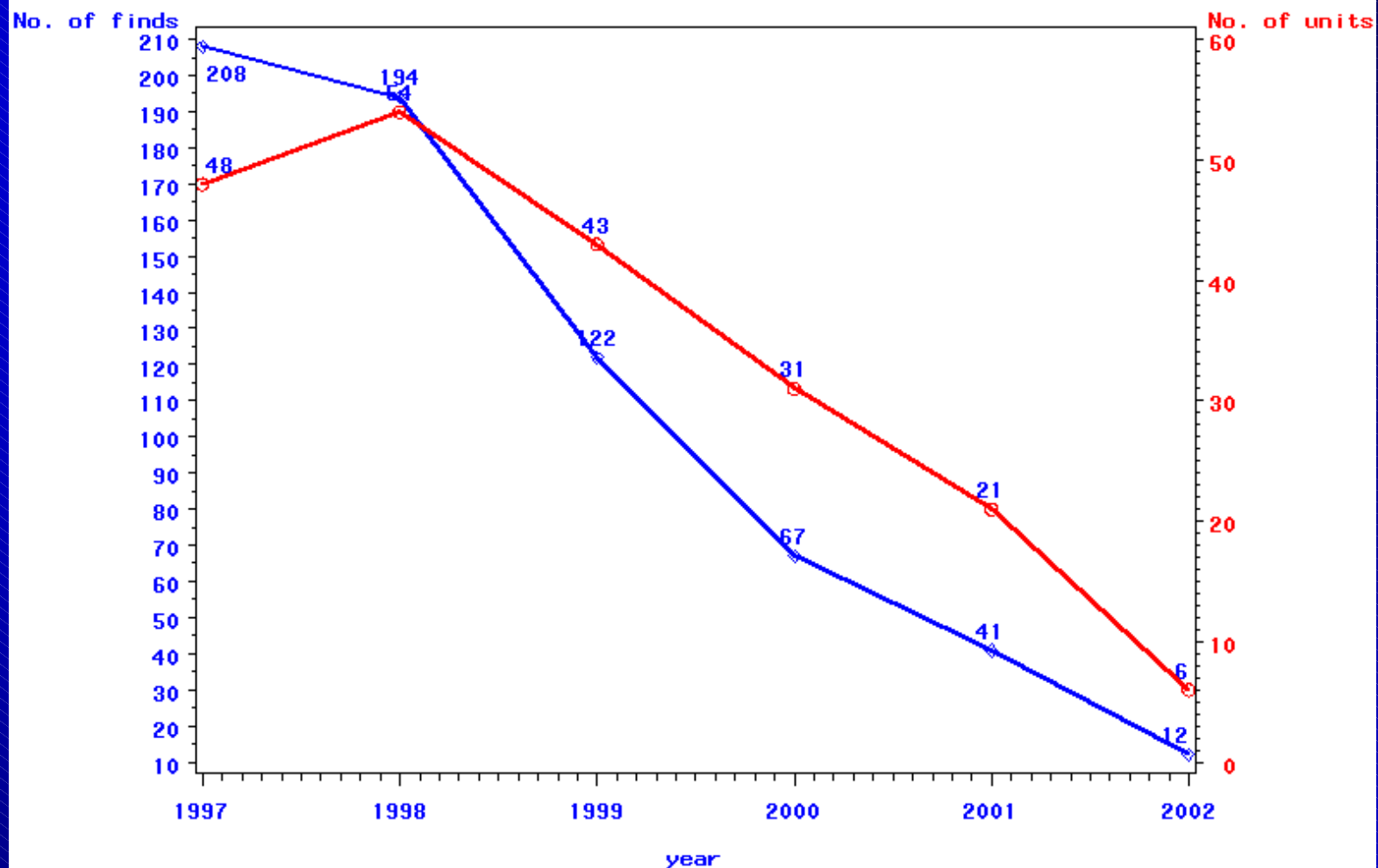


# Clear Lake Project

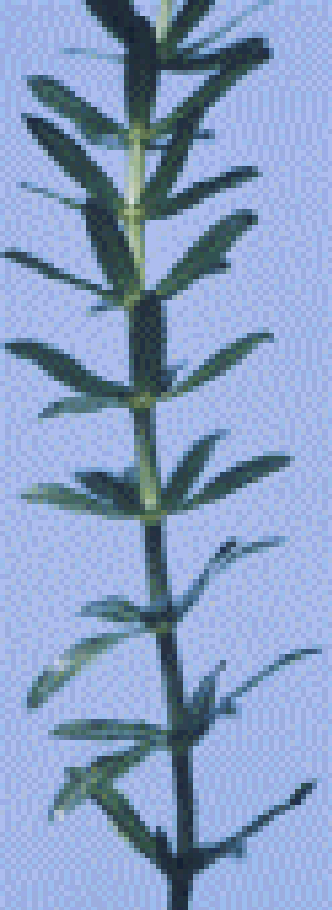




## Clear Lake: No. of Hydrilla Finds and Infested Mgt. Units



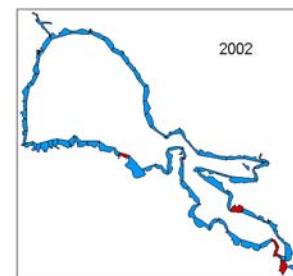
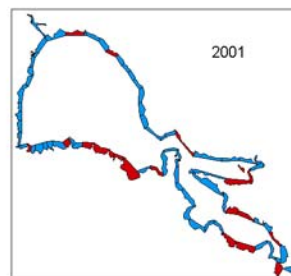
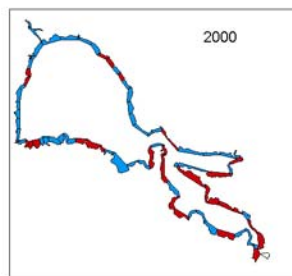
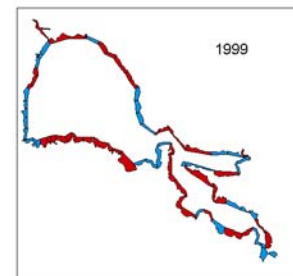
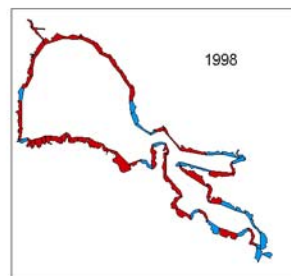
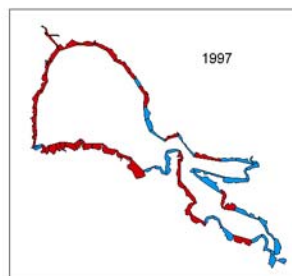
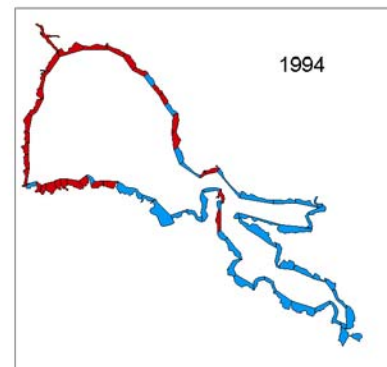
Clear  
Lake

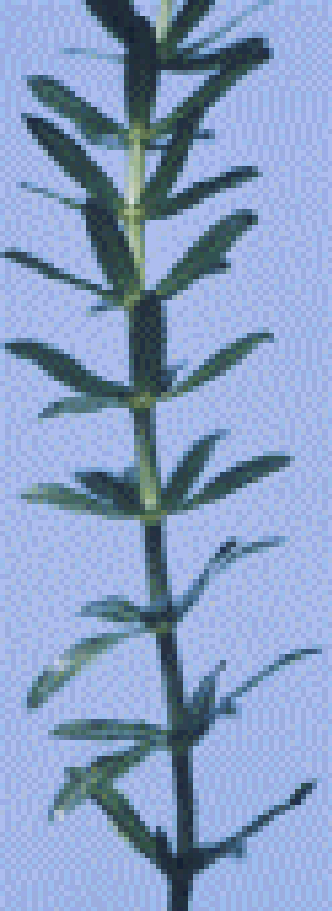


**PLATE 7**

**Yearly Survey Results, Clear Lake  
Hydrilla Infestation, 1994-2002**

- = Found during Year
- = Surveyed, but None Found





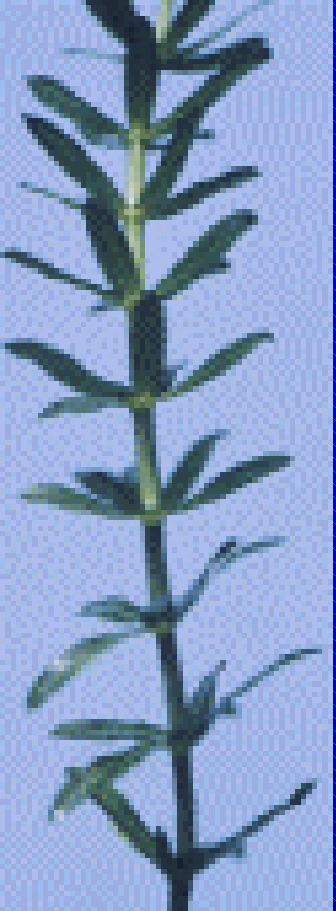
# **Clear Lake: No. of Previously Infested Mgt. Units, in Which no Hydrilla has Been Detected for a Minimum of Three Years**

<b>Year</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
<b>Number of Previously Infested Management Units Hydrilla Free for 3 Years</b>	<b>4</b>	<b>4</b>	<b>13</b>	<b>30</b>



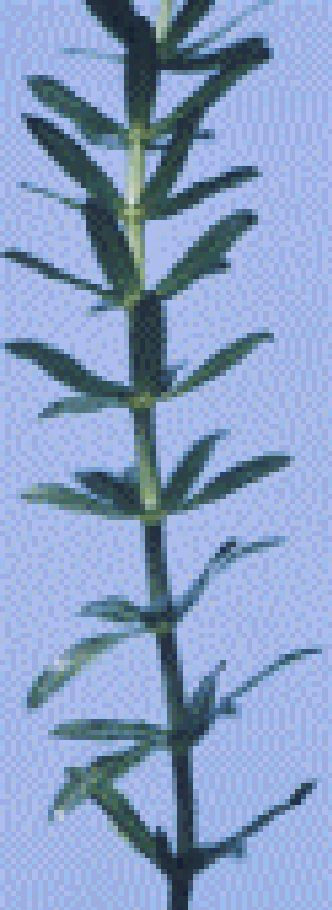
# Clear Lake Project

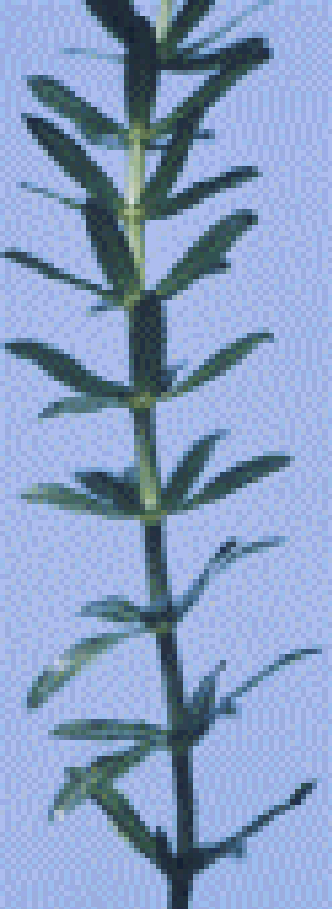
- Komeen
- Sonar SRP
- Sonar AS
- Avast!



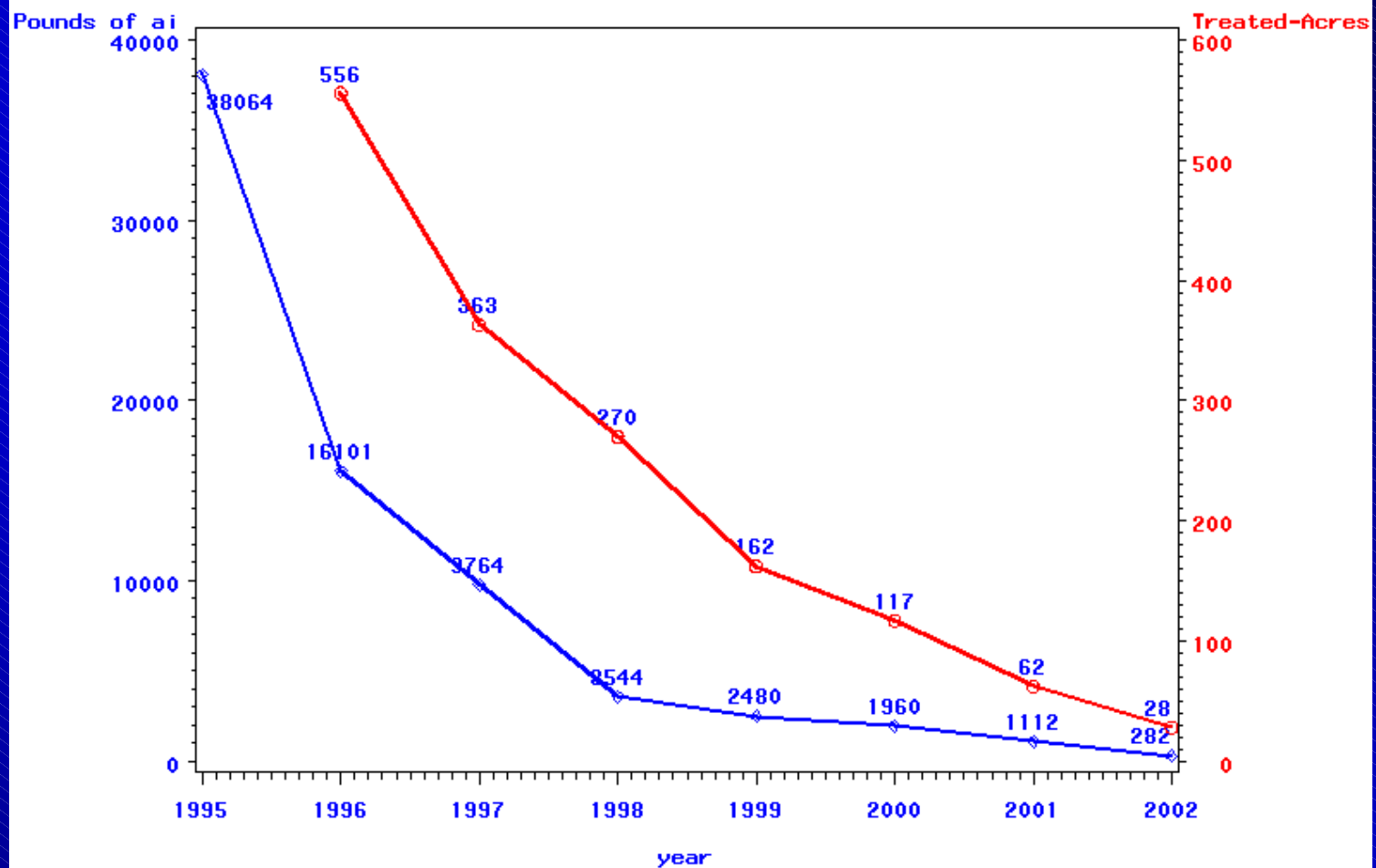
# Clear Lake Project

- Komeen label
  - Copper-ethylenediamine complex and copper sulfate pentahydrate
  - Hydrilla: 0.75 – 1.0 ppm for control
  - “Areas treated with Komeen may be used for fishing, swimming, drinking, and watering livestock immediately after treatment.”
  - “If treated water is a source of potable, the residue of copper must not exceed 1 ppm”
  - “concentrations above 1.0 ppm  $\text{Cu}^{++}$  may be injurious to crops, grass, ornamentals and other foliage.”



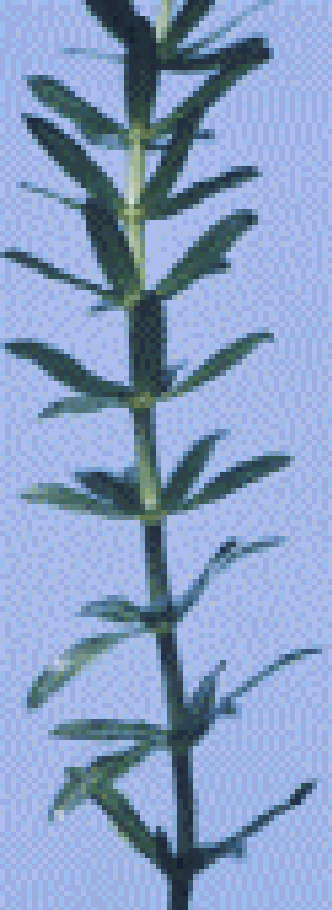


Clear Lake: Pounds of Copper Herbicide Used and No. of Surface Acres Treated



# Clear Lake Project

- Sonar SRP label
  - Fluridone
  - Hydrilla: 150 ppb max rate for control, *“the sum of all applications cannot exceed 150 ppb per annual growth cycle.”*
  - “Concentrations of the active ingredient fluridone up to 150 ppb are allowed in potable water sources”







# Clear Lake Project

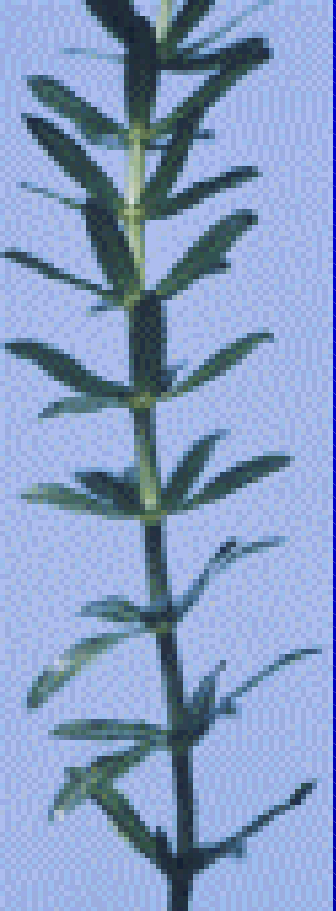
- Sonar SRP label
- WATER USE RESTRICTIONS  
FOLLOWING APPLICATIONS WITH  
SONAR SRP (DAYS)

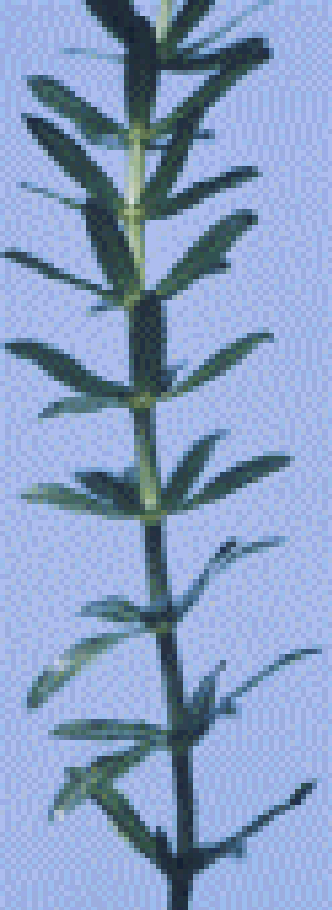
Application Rate	Drinking	Fishing	Swimming	Livestock/ Pet Consumption	Irrigation
Max Rate (150 ppb)	0	0	0	0	7-30*

\* 7 days for lakes and reservoirs

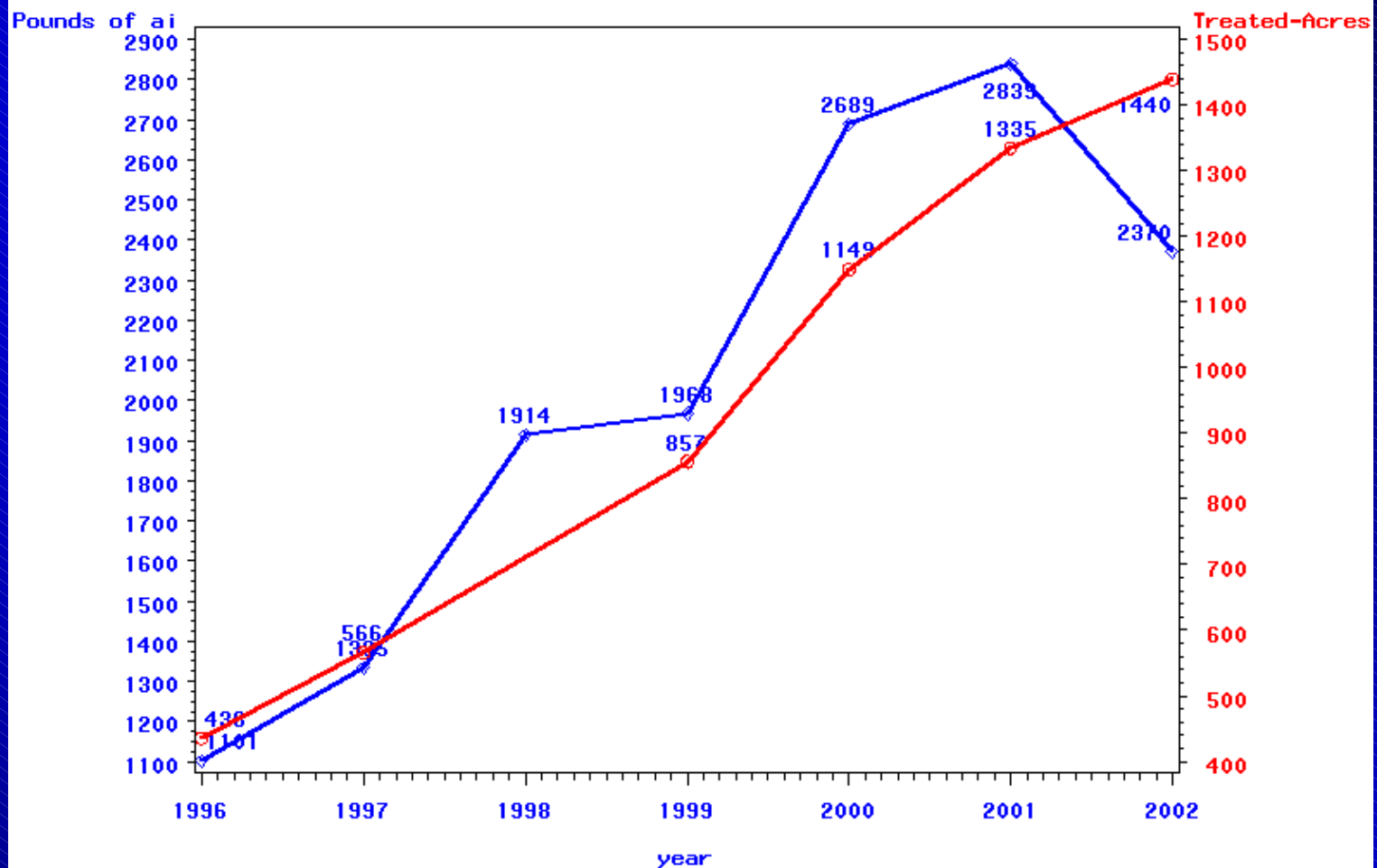
# Clear Lake Project

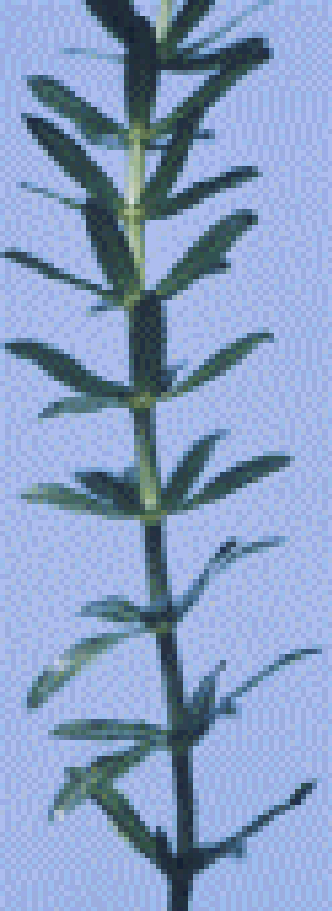
- Sonar SRP label
  - “Where FastEST has determined that concentrations are less than 10 parts per billion”
    - “no irrigation precautions for irrigating established tree crops,... row crops or turf”.
  - “do not use ... treated water if concentration ... greater than 5 ppb.”
    - tobacco, tomatoes, peppers..newly seeded grasses





## Clear Lake: Pounds of Fluridone Herbicide Used and No. of Surface Acres Treated





## Sonar SRP apps

### First app

2001-May 21

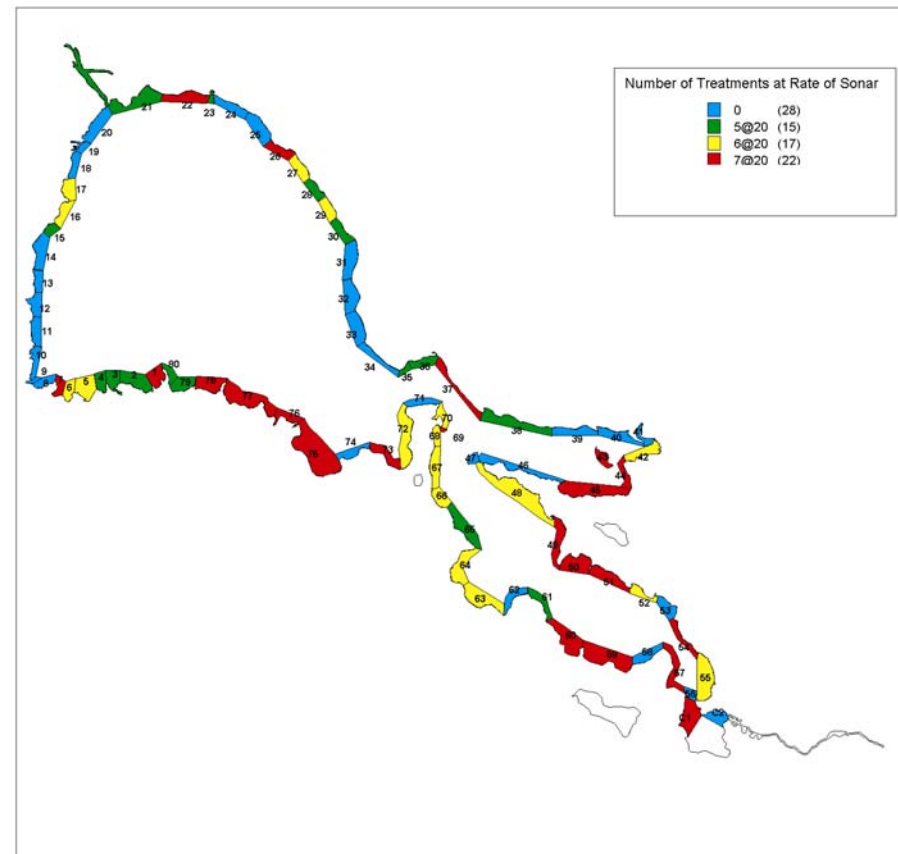
2002-May 28

### Treatment protocol

Depends upon  
# years since last  
find

#### PLATE 8

#### Clear Lake Sonar Treatments in 2002

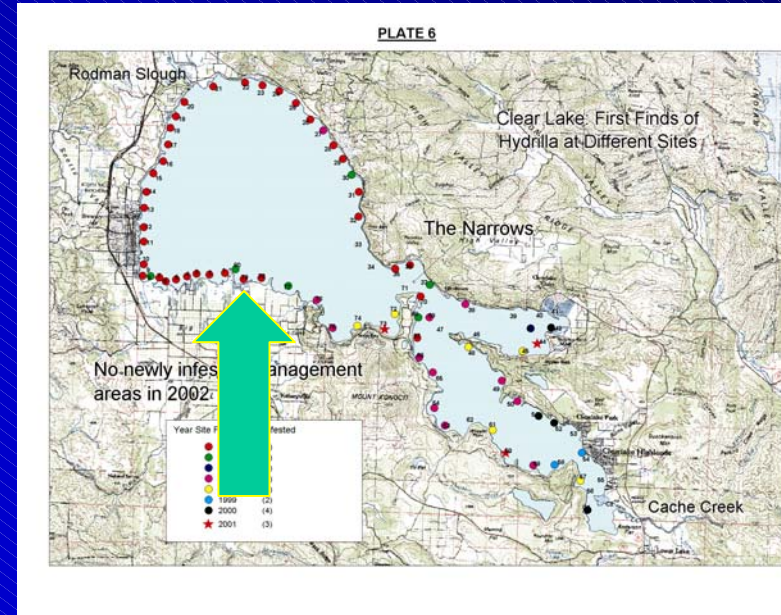


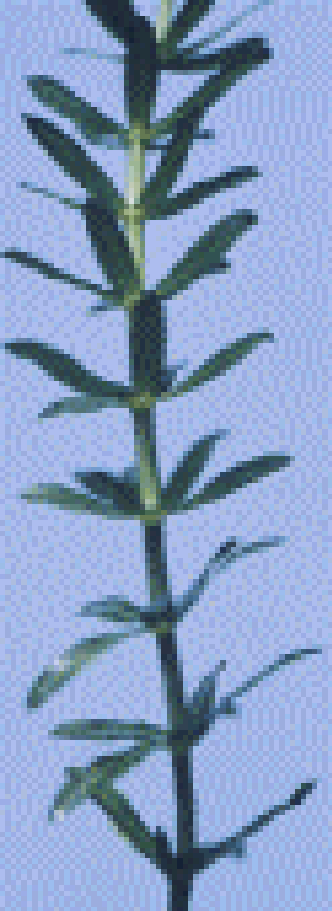


# Lake County Project

AVAST! SRP test  
Treatment:  
Unit 80 (green arrow)  
5 apps at 20 ppb

Results:  
Complete control of coontail  
Appeared equivalent to Sonar SRP





# Clear Lake-Water Sampling Results-Fluridone 2001

## Sample Stations

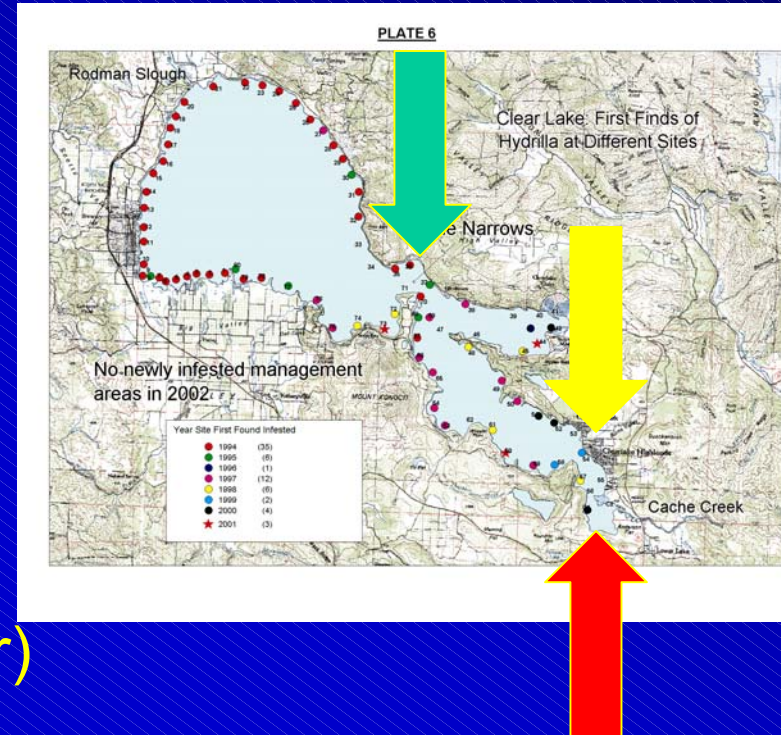
Units 6, 16, 26  
(around upper arm)

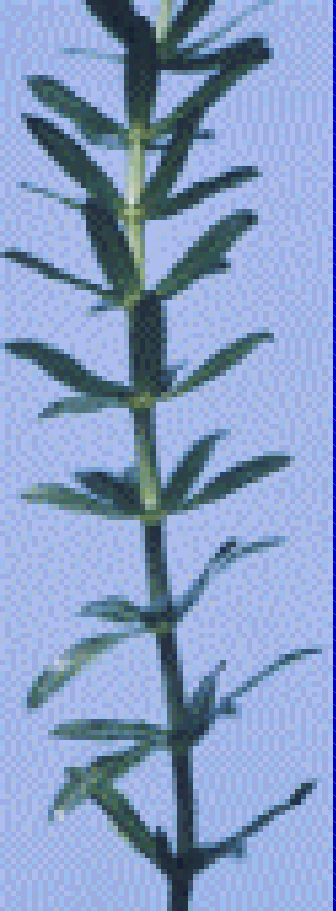
Sample Station, Unit 36  
Narrows

(green arrow)

Sample station-Unit 52+  
Water intake, unit 54  
(raw and finished water)  
(yellow arrow)

Sample Station  
Unit C1-Cache Creek  
(red arrow)





# Clear Lake-Water Sampling Results-Fluridone 2001

## Sampling dates

June 25, 2001

August 21/22, 2001

## Sampling depths

mid, bottom

## Analysis method

ELISA

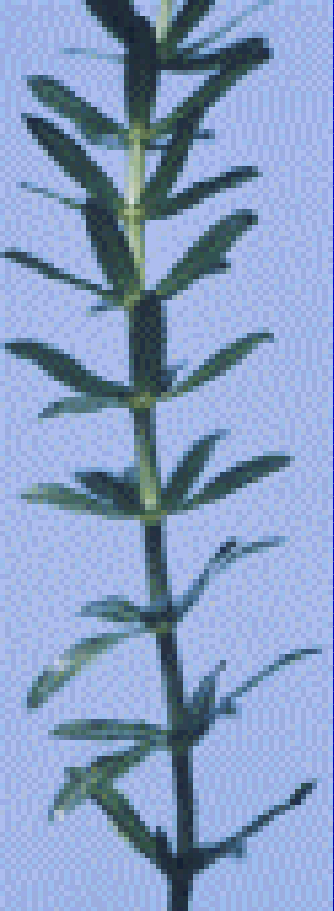
## Results:

All samples below 5 ppb

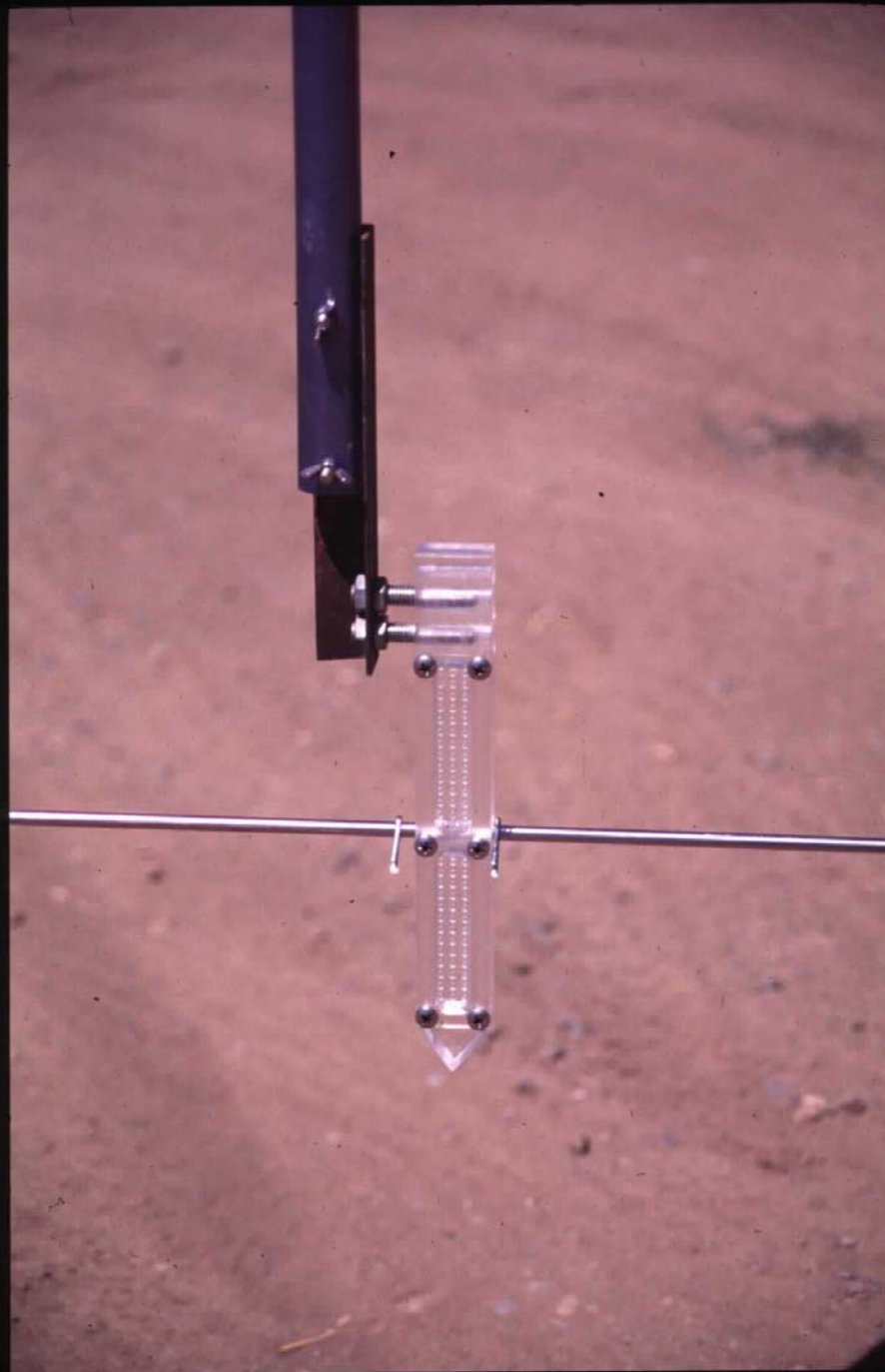
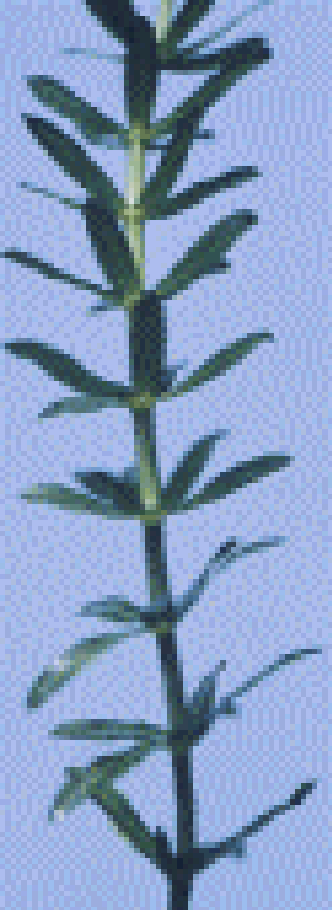
# Clear Lake-Water Sampling Results-Fluridone 2001

Dr. Lars Anderson, USDA-ARS Exotic and Invasive  
Weed Unit

Used sampler fitted with dialysis membrane to  
measure fluridone concentrations in hydrosoil pore  
water and boundary layer in Sonar SRP treated sites.







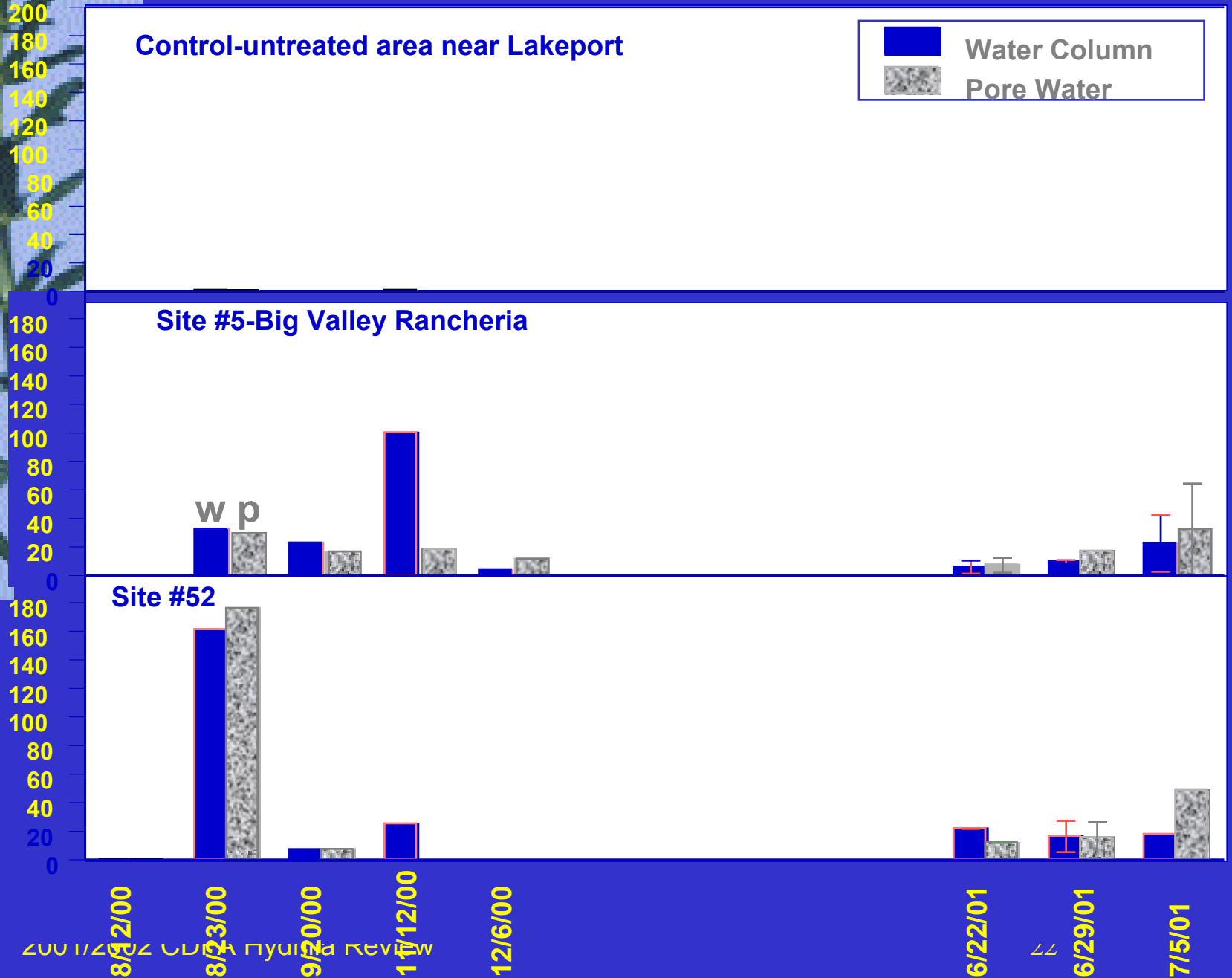
# Fluridone concentration in water column and pore water at 3 sites in Clear Lake

Control-untreated area near Lakeport

Water Column  
Pore Water

Site #5-Big Valley Rancheria

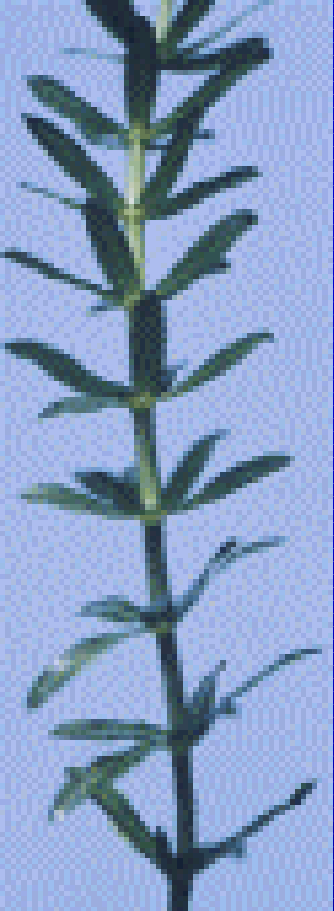
Site #52

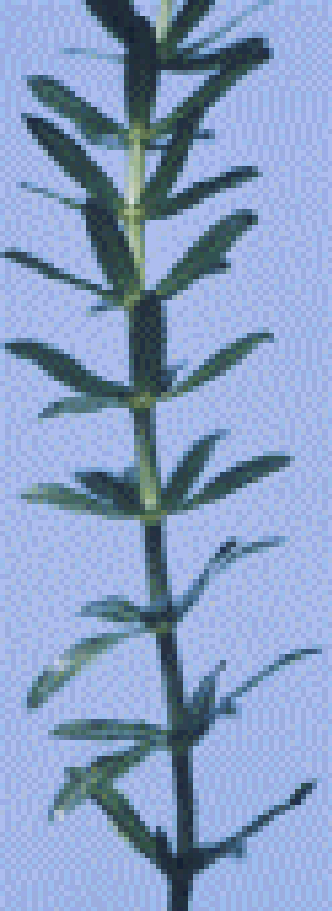


# Clear Lake-Water Sampling Results-Fluridone 2001

Dr. Lars Anderson, USDA-ARS Exotic and Invasive  
Weed Unit

Concluded that this variability was due to the patchy  
nature of the pellet distribution.



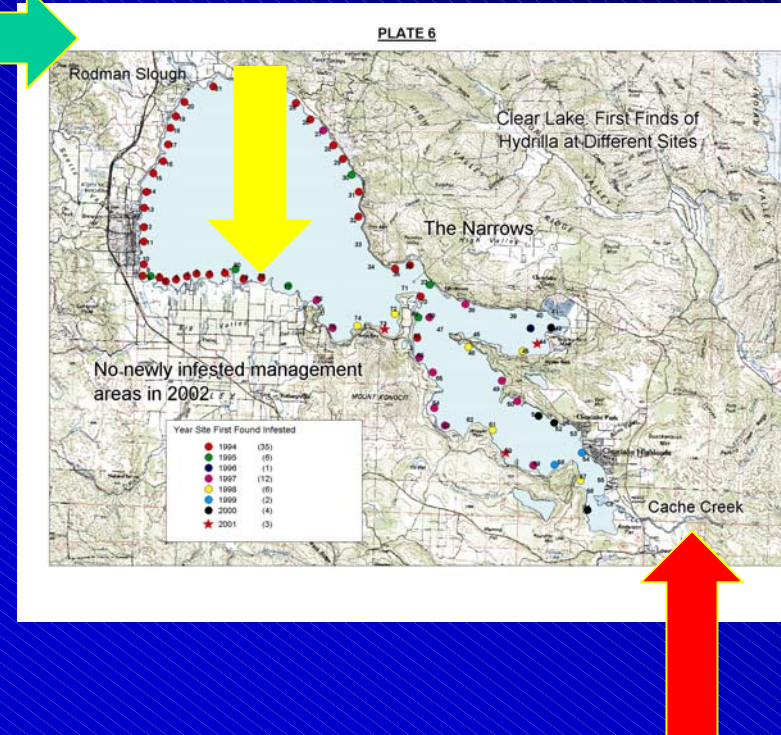


# Clear Lake-Water Sampling Results-Fluridone 2002

Sample Station-inlet  
Rodman Slough  
(green arrow)

Sample stations-lake  
Unit 78  
(yellow arrow)

Sample Station-outlet  
Cache Creek  
(red arrow)







## Clear Lake-Water Sampling Results-Fluridone 2002

Beneficial Use Protective Water Quality Limit (BUPWQL) for fluridone defined as 5 ppb, based on irrigation restrictions on Sonar SRP label.

Analyses performed by the CDFA Center for Analytical Chemistry

Method	Samples	Reporting Level	% Recovery	Spike levels	Minimum Detect Level
<b>ELISA</b> (quantitative)	<b>All</b>	<b>5 ppb</b>	<b>87-114%</b>	<b>0.5-20 ppb</b>	<b>0.1 ppb</b>
<b>GC/MS</b> (structure confirmation)	<b>~10%</b>	<b>7 ppb</b>	<b>113-125%</b>	<b>20 ppb</b>	<b>5 ppb</b>



# Clear Lake-Water Sampling Results-Fluridone 2002

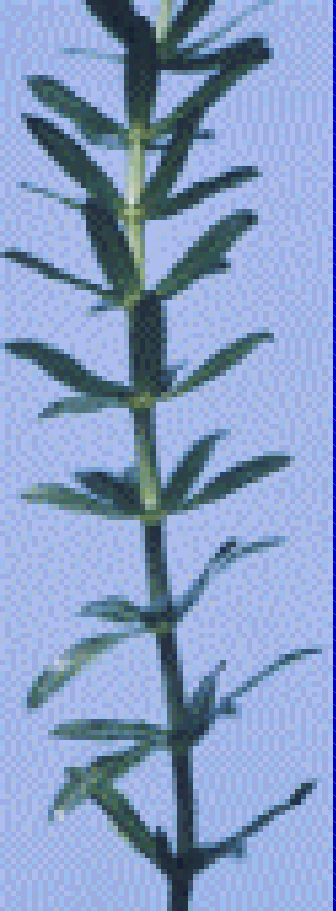
## **Inlet-Outlet**

### **Sampling Dates**

**Monthly from April to October  
(except September)**

**All samples either ND or <BUPWQL**

**GC/MS confirmation on 3 of 3 samples**



# **Clear Lake-Water Sampling Results-Fluridone**

## **Unit 78**

### **Sonar SRP 20 ppb application dates**

06/06/2002	06/20/2002	07/08/2002
07/22/2002	08/05/2002	08/19/2002
09/03/2002		

### **Sampling times-scheduled**

- 2 to 24 hours before each application
- 4 days after each application
- 14 days after final application
- 21 days after final application
- 30 days after final application

### **Sampling locations**

Within, 90 feet, 300 feet toward mid of lake

### **Sampling depths**

- 1 foot below surface
- 1 foot above sediment/bottom

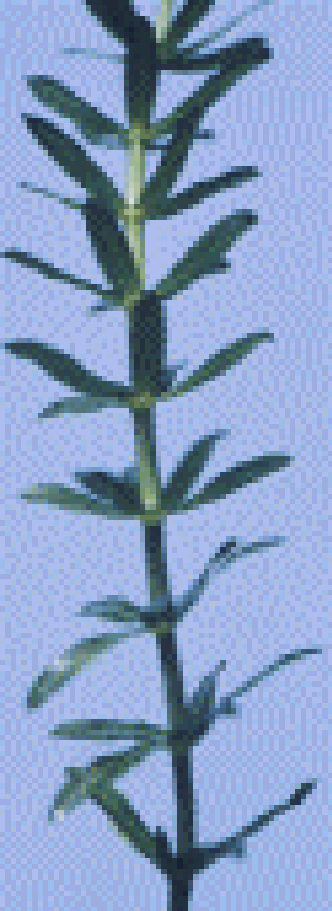


# Clear Lake-Water Sampling Results-Fluridone 2002

## Unit 78

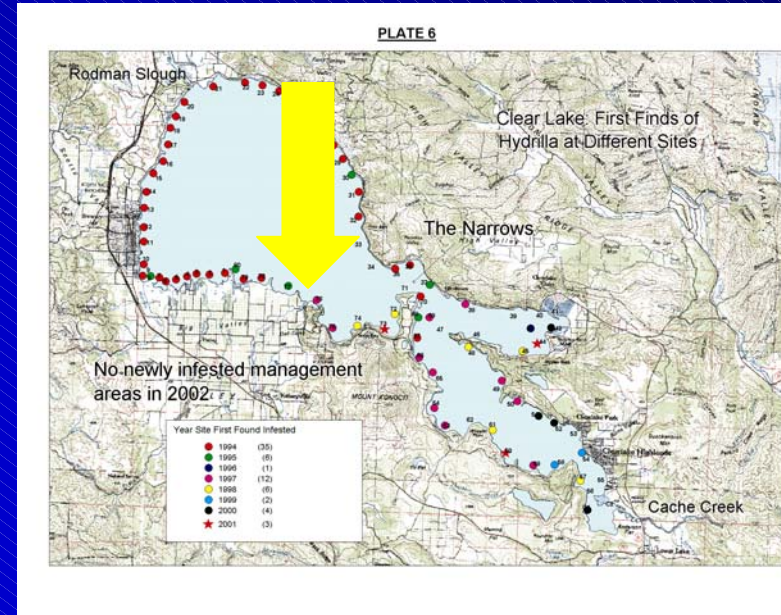
**Results: All samples < BUPWQL**

**GC/MS confirmation on 7 of 7 samples**

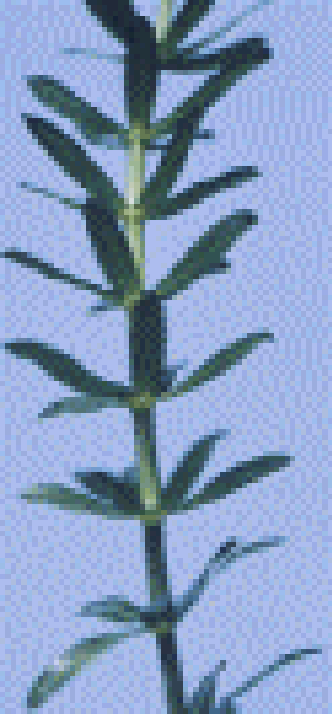


# Clear Lake-Water Sampling Results-Copper 2002

Sample stations-lake  
Unit 76  
(yellow arrow)





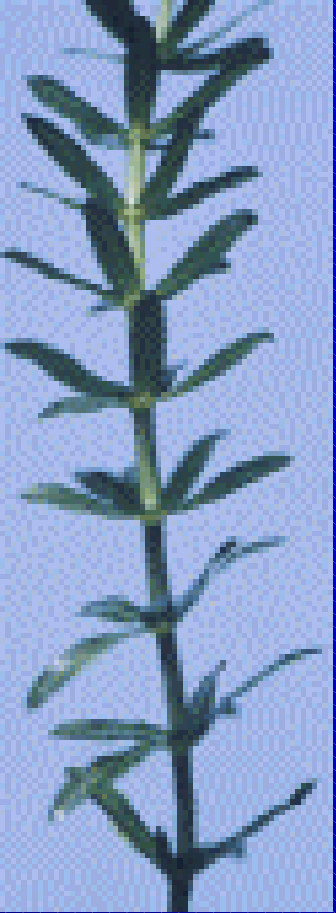


## Clear Lake-Water Sampling Results-Copper

Beneficial Use Protective Water Quality Limit (BUPWQL) for copper defined as 20 ppb, based on effects on freshwater aquatic life as per the California Toxics Rule.

Analyses performed by the CDFA Center for Analytical Chemistry

Method	Samples	Reporting Level	% Recovery	Spike levels	Minimum Detect Level
Neocuproine method for Cu <sup>+</sup> (UV/VIS) (quantitative)	All	20 ppb	79-109%	30-60 ppb	20 ppb



# **Clear Lake-Water Sampling Results-Copper**

## **Unit 76**

**Komeen 1 ppm application date**  
**07/01/2002**

### **Sampling times-scheduled**

**1 hours before application**  
**2 hours after application**  
**1 days after application**  
**4 days after application**  
**7 days after application**  
**14 days after application**

### **Sampling locations**

**Within, 30 feet, 1200 feet toward mid of lake**

### **Sampling depths**

**1 foot below surface**  
**1 foot above sediment/bottom**

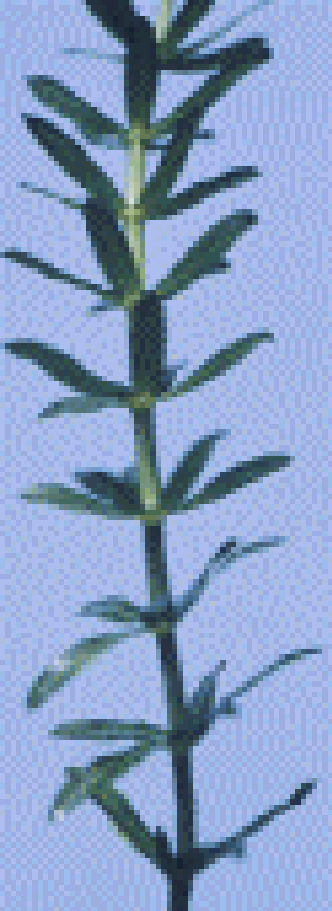
# Clear Lake-Water Sampling Results-Copper 2002

## Unit 76

### Results:

**All but one\* samples < BUPWQL**

**\*30 feet toward center of lake,  
2 hours after application,  
Bottom sample,  
Copper = 132 ppb**





# Lake County Project

- **Surveys**
  - Indian Valley Reservoir
  - Highland Spring Reservoir
  - Lake Pillsbury
  - Blue Lakes
  - Thurston Lake
  - Lake Berryessa
  - Cache Creek (access points)
- **Outreach and Education**
  - Meetings with Stakeholders
  - Distribution of literature
  - One newspaper article, one press release